

REVIEW OF NEARCTIC *METACHELA* COQUILLET,
WITH DESCRIPTION OF A NEW SPECIES
(DIPTERA: EMPIDIDAE; HEMERODROMIINAE)

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Abstract—The genus *Metachela* is reviewed for the Nearctic region. Generic diagnosis and new diagnoses of two previously described species, *Metachela albipes* (Walker) and *M. collusor* (Melander), are presented with discussion of intraspecific variation in male terminalia. *Metachela convexa* n. sp. is described. A key to Nearctic males, illustrations of male terminalia, and known distributions are provided.

Key Words: Diptera, Empididae, Hemerodromiinae, *Metachela*, dance flies

Aquatic dance flies of the genus *Metachela* Coquillett are small, slender, and possess strongly raptorial fore legs; wings lack an anal lobe and thus are relatively slender. The genus *Metachela*, therefore, is similar in general morphology to other Hemerodromiinae genera, the Nearctic species of which were treated by Melander (1902, 1928, 1947). The present study was facilitated by the relatively large numbers of *Metachela* specimens added to North American collections since Melander's (1947) revision. Generic diagnosis, diagnoses of two previously described species, description of a new species, known distributions, and a key to Nearctic males are provided.

Metachela species are uniform in general morphology and coloration, and possess few characters of taxonomic value. Male terminalia are of little use in separating the two widespread, common species, but are distinct for a newly described species. Interpretation of male terminalia follows that of Chvala (1983). The only other taxonomic tool was related to the structure and vestiture of the fore femora. Vestiture terminology follows McAlpine et al. (1981). The ba-

sic form of macrotrichia is a seta (= a hollow, articulated, epidermal outgrowth), with the following descriptive terms applied to it: hair (= long, weak seta); bristle (= long, strong seta); and setula (= short, strong seta). In addition to the various forms of macrotrichia, *Metachela* specimens possess pollinosity (= dense microtrichia) over much of the body. No reliable characters were discovered for females despite examination of several hundred, and thus only collecting data pertaining to males could be used to generate the distribution map.

The following institutions provided material upon which this work is based: American Museum of Natural History, New York (AMNH); Biosystematics Research Centre, Ottawa (Canadian National Collection) (CNC); California Academy of Sciences, San Francisco (CAS); Cornell University, Ithaca (CU); Florida State Collection of Arthropods, Gainesville (FSCA); Illinois Natural History Survey (INHS); United States National Museum of Natural History, Washington D. C. (USNM); University of California, Riverside (UCR); University of Kansas, Lawrence (SNOW); University of Minnesota, St. Paul (UMSP); Utah State

University, Logan (USU); and Washington State University (JAMES). Specimens also came from the author's collection (MAC) and the Purdue Entomological Research Collection (PERC).

Genus *Metachela* Coquillett

Metachela Coquillett 1903: 253, 263. Type species: *Hemerodromia collusor* Melander (orig. des.).

Diagnosis.—The genus *Metachela* is distinguished from other genera of Hemerodromiinae by the combination of the following: relatively long, thick stylus of the antennae, absence of crossvein bm-cu, and existence of two veins (anterior one forked) arising from apex of fused cell bm + dm.

Description.—Small (body length ca. 3.5 to 4.0 mm), slender, with strongly raptorial fore legs. Nearctic species uniformly greyish black with golden pollinosity on scutum, white pollinosity elsewhere on thorax and on head. Mouthparts and palps yellowish. Legs concolorous yellow, except for darkened apical one or two tarsomeres. Fore femora and fore tibiae possess two median rows of black setulae ventrally, with those of fore femora flanked by row of light brown bristles and with group of paler setae basoventrally. Mid tibiae ventrally with short, apical row of black setulae. Body setae yellowish. Prominent setae of head including pair of long ocellars and pair of long inner verticals, with a pair of shorter, outer verticals detectable on some specimens. Prominent thoracic setae including several short setae on pronotum, pair of long notopleurals, pair of long supraalars, and pair of long scutellars apically, with very short pair immediately lateral to scutellars. Male terminalia composed of hypandrium, pair of gonocoxites that each possess apical fringe of setae and apicodorsal claw-like gonostylus, and epandrium consisting of two, broadened lobes that rest on top of gonocoxites. Aedeagus arising from complex aedeagal apodeme; relatively thick, with apex sur-

rounded by several very small, sclerotized plates. Segments eight and nine of female abdomen forming exposed "ovipositor" that is sclerotized and terminates in pair of slender cerci.

Remarks.—Flies of the genus *Metachela* closely resemble species of *Chelifera*, but the difference in antenna stylus and stable differences in wing venation support separate generic status, a taxonomic treatment proposed by Coquillett (1903) and followed by Melander (1947). *Metachela* appears to be a very small genus; in addition to the Nearctic species treated in this paper, one species occurs in central Europe (Frey 1956). South American species placed in *Metachela* by Collin (1933) and Smith (1962) are, according to Smith (1962), not typical of the genus, differing in several respects from the type species; the taxonomic status of these species has yet to be established.

Almost nothing is known about the biology of *Metachela* species, but adults have been observed preying on adult Simuliidae (Peterson 1960). Most specimens in collections have been swept off riparian vegetation and taken in Malaise traps placed along and across streams. Collecting data reveal that adults appear by late June and continue to be taken well into September. Larval and pupal stages have not been described.

Nearctic species are either boreal or associated with western mountain streams, with only one, *M. albipes* (Walker), extending into eastern North America.

**KEY TO NEARCTIC SPECIES OF
METACHELA COQUILLET
(MALES ONLY)**

- 1. Gonocoxites expanded laterally, strongly convex in dorsal view; apex of epandrial lobes turned inward as rounded process lined with black setulae (Fig. 1) *Metachela convexa*, new species
- Gonocoxites not expanded laterally, not strongly convex in dorsal view; apex of epandrial lobes without in-turned, rounded process lined with black setulae (see Figs. 4–7) 2
- 2. Inner surface of fore femora with long setae; length of basoventral setae of fore femora

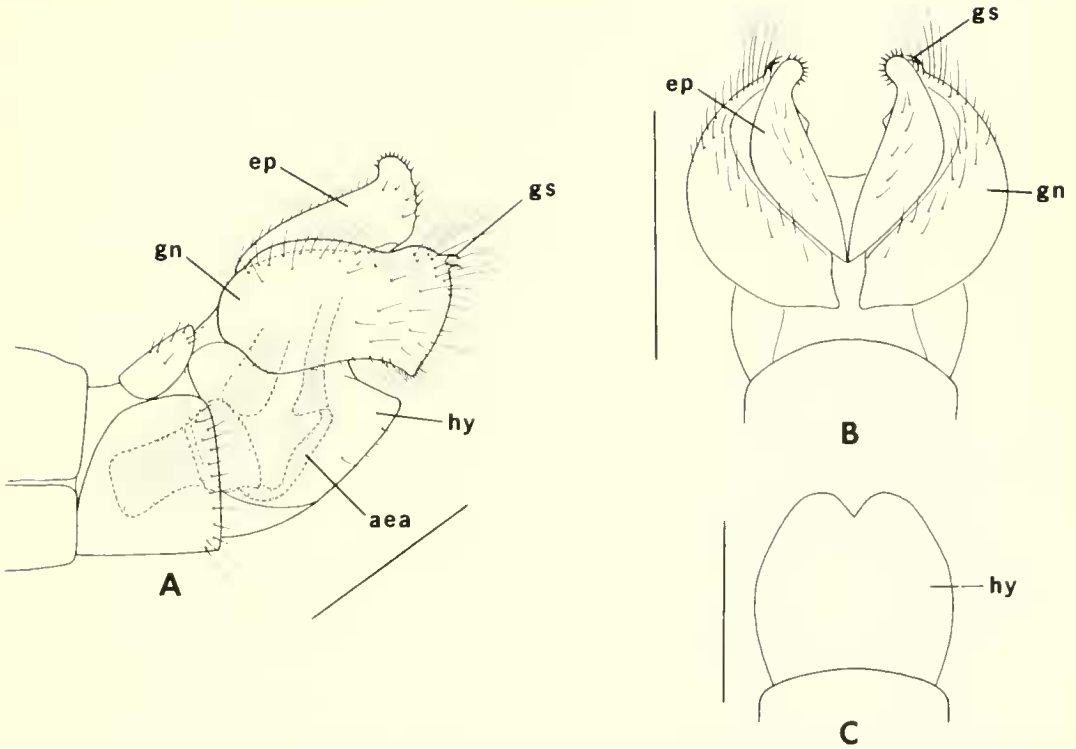


Fig. 1. *Metachela convexa* male terminalia (ep = epandrial lobe; gn = gonocoxite; gs = gonostylus; hy = hypandrium; aea = aedeagal apodeme). A = lateral view; only basal portion of aedeagal apodeme shown. B = dorsal view; hypandrium removed. C = ventral view of hypandrium. Scale: 0.5 mm.

longer than greatest width of fore femur (Fig. 2) *Metachela albipes* (Walker)
 Inner surface of fore femora without long setae; length of basoventral setae of fore femora subequal to greatest width of fore femur (Fig. 3) *Metachela collusor* Melander

***Metachela albipes* (Walker)**

Metachela albipes (Walker), 1849: 505 (*Hemerodromia*).

Diagnosis.—*Male*: Body length, including terminalia, ca. 4.0 mm. Inner surface of fore femora (Fig. 2) with long setae; fore femora relatively slender, ca. 4 times longer than greatest width, with group of basoventral setae longer than greatest width of fore femora. Male terminalia as in Fig. 4; gonocoxites not expanded laterally; apical fringe of gonocoxites with longest setae ca.

as long as epandrial lobes; apex of epandrial lobes smoothly rounded, without black setulae. *Female*: indistinguishable from females of other *Metachela* species.

Type material.—Lectotype male (Smith 1971: 365), Canada, St. Martin's Falls, Albany River, Hudson's Bay (G. Barnston label), deposited in British Museum (Natural History). The specimen was examined by K. V. G. Smith (June 1988), who reported (pers. comm.) it to be in "very bad condition," but "the fringe of long hairs on the inner surface of the front femur are quite easily seen." The terminalia, mounted in balsam and illustrated in Smith (1971), agree with specimens that I have seen from Canada and the United States.

Specimens examined.—164 males. Alberta: 2, Belly River, Aug.; 15, Wild Hay R. at Hwy. 40, Aug. (CNC). British Colum-

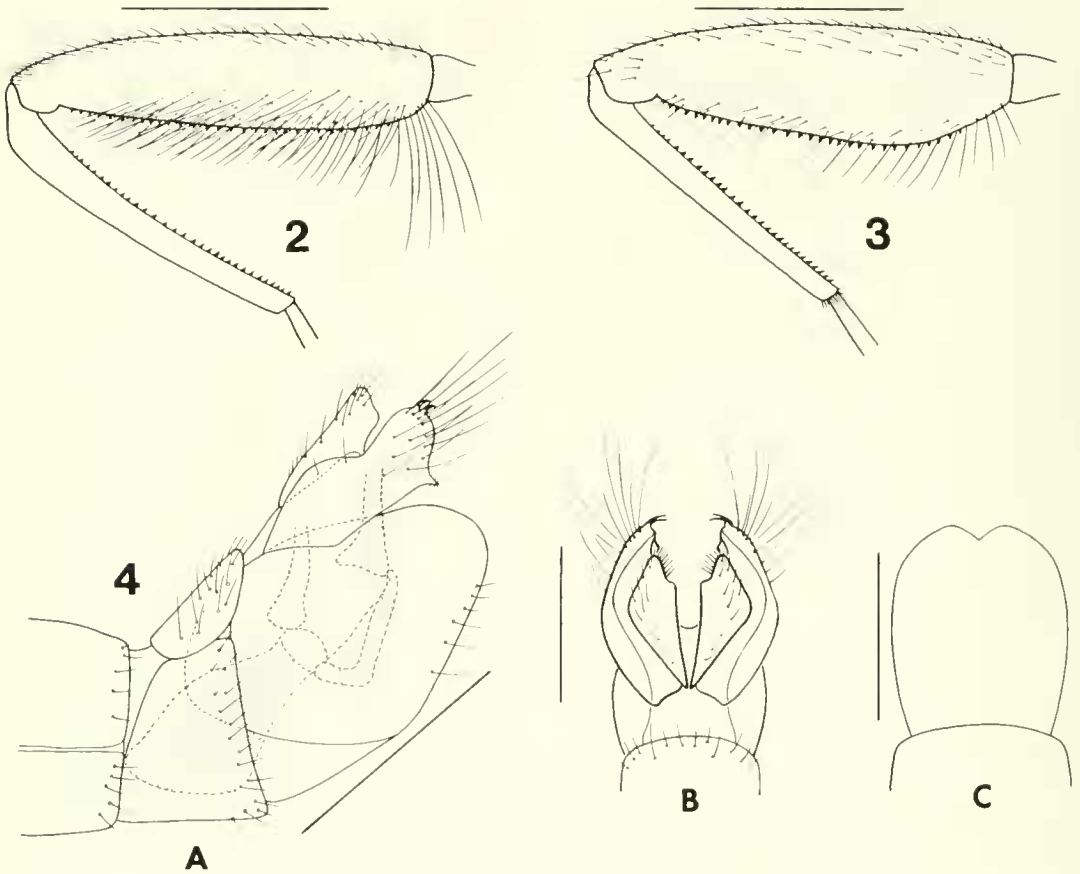


Fig. 2. *Metachela albipes* front femur, inner surface. Scale: 0.5 mm.

Fig. 3. *Metachela collusor* front femur, inner surface. Scale: 0.5 mm.

Fig. 4. *Metachela albipes* male terminalia. A = lateral view; only basal portion of aedeagal apodeme shown. B = dorsal view; hypandrium removed. C = ventral view of hypandrium. Scale: 0.5 mm.

bia: 1, Taylor Landing, Peace R., Aug. (CAS); 3, Tyree, 27 mi. E. Prince Rupert, June; 1, Lakelsch Bog nr. Terrace, June (CNC). Manitoba: 1, Mosquito Pt., Churchill R., Aug. (CNC); 4, 20 mi S. Churchill, Aug. (UMSP). Quebec: 1, Brador Bay, July; 2, Great Whale R., July; 1, Indian House L., Aug.; 4, Ft. Chino, Aug.-Sep. (CNC); 1, Brador Bay, Aug. (FSCA). California: 1, Carmel, July (AMNH); 32, Los Angeles Co., n. fork San Gabriel R., nr. Coldbrook Sta., June; 1, Modoc Co., Cedar Pass, Aug. (CAS); 4, Placer Co., Granite Flat empgr., Sep. (MAC); 12, Mono Co., Lower Rock Cr., Sep. (UCR); 1, Lone Pine, July; 1, Sequoia Nat. Pk., Aug. (SNOW); 1, Humboldt Co.,

Hydesville, Aug.; 1, Tulare Co., Camp Nelson, July; 1, Barton Flat, South Fork Camp, Sep.; 1, Los Angeles Co., s. fork Santa Ana R., Aug.; 2, Palm Springs, Nov. (USNM). Montana: 2, Glacier Nat. Pk., Swiftcurrent empgr., Aug. (CAS); 1, Thompson, Aug. (USNM). New Hampshire: 1, "White Mts." (USNM). Oregon: 1, Grant Co., Beech Cr. empgr., July; 1, Lane Co., Salt Cr. Falls empgr., July; 1, Wasco Co., Warm Springs Indiana Res., Beaver Cr., June (CAS); 1, Baker Co., Big Cr., Aug. (JAMES); 1, Eagle Cr., Aug.; 3, Humbug St. Pk., Aug. (USNM). Washington: 1, Clallum Co., Tumbling Rapids Rec. Area, July; 3, Grays Harbor Co., Olympic Nat. Pk., Willaby empgr., July;

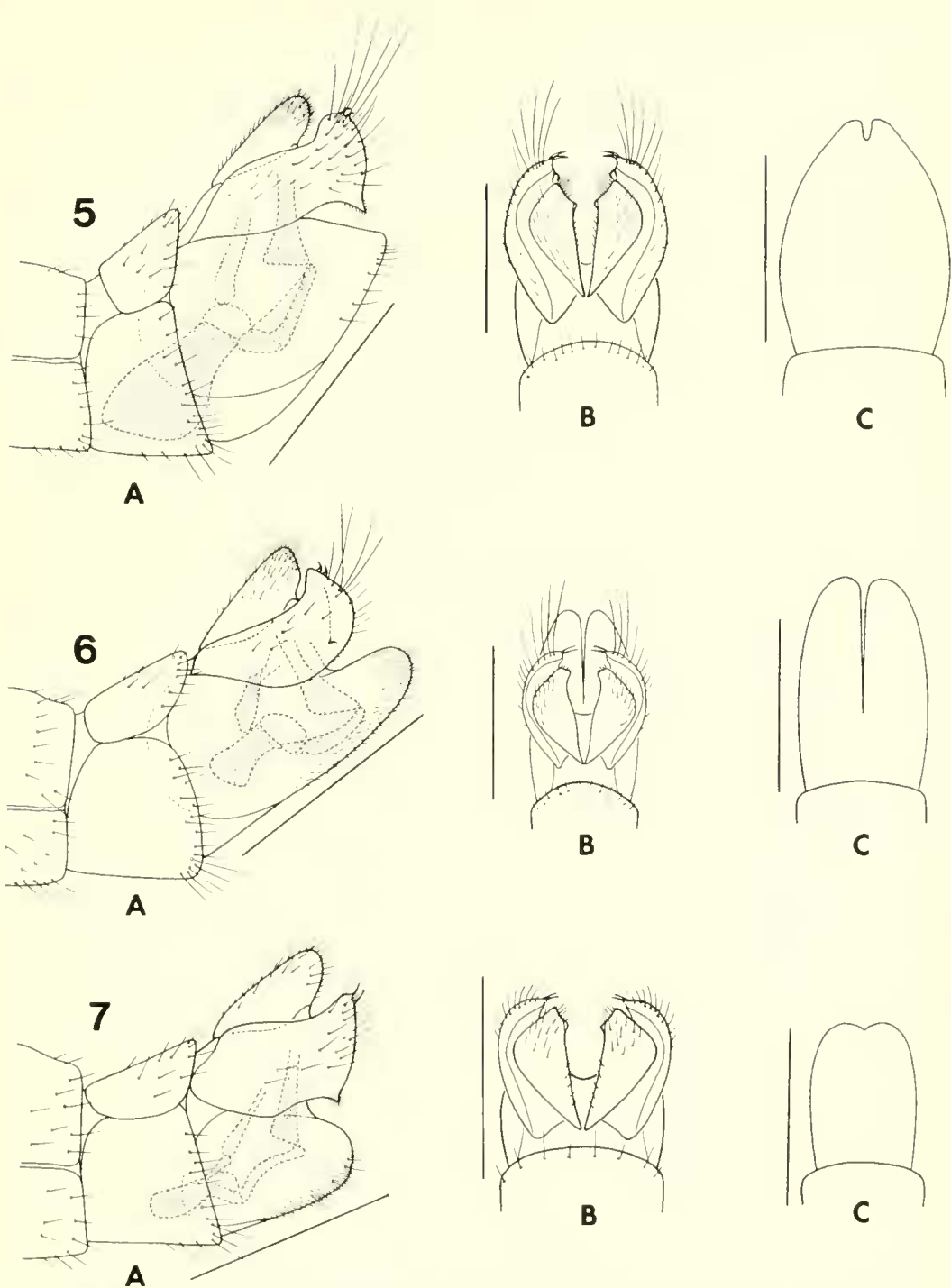


Fig. 5. *Metachela collusor* male terminalia, predominant form. A = lateral view; only basal portion of aedeagal apodeme shown. B = dorsal view; hypandrium removed. C = ventral view of hypandrium. Scale: 0.5 mm

Fig. 6. *Metachela collusor* male terminalia; digitate form. A = lateral view; only basal portion of aedeagal apodeme shown. B = dorsal view; hypandrium shown. C = ventral view of hypandrium. Scale: 0.5 mm.

Fig. 7. *Metachela collusor* male terminalia; small form. A = lateral view; only basal portion of aedeagal apodeme shown. B = dorsal view; hypandrium removed. C = ventral view of hypandrium. Scale: 0.5 mm.

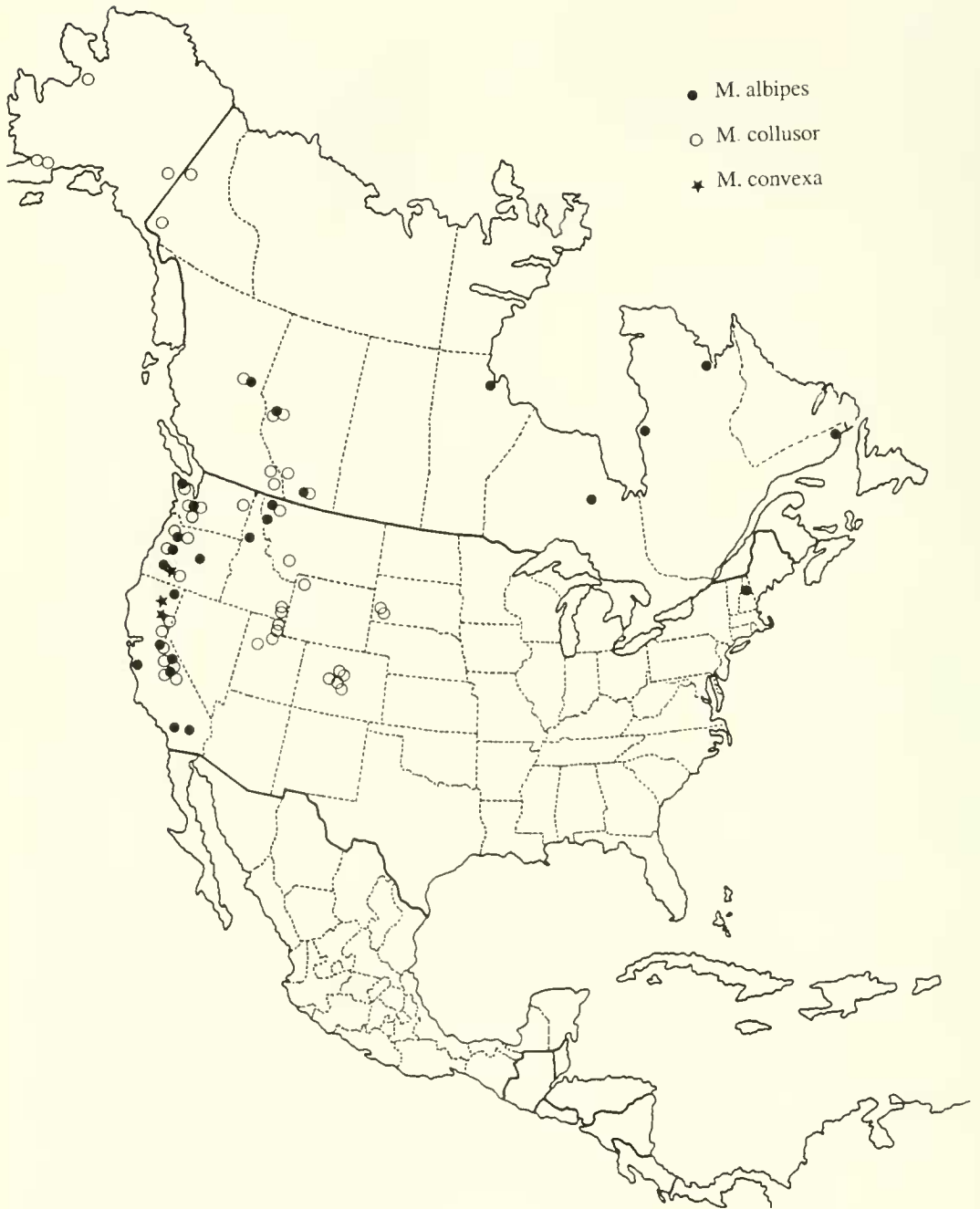


Fig. 8. Distribution of Nearctic *Metachela*.

1, Jefferson Co., Olympic Nat. Pk., July (CAS); 10, Asotin Co., Asotin Cr., Aug.; 1, Jefferson Co., Hoh R., Cottonwood cmpgr., July; 40, Lewis Co., Rainbow Falls State Pk., June–July (JAMES); 1, Yakima Co.,

Tieton R., 20 mi. W. Natches, Oct.; 1, Yakima Co., Oak Cr. canyon, 6 mi. W. Natches, Oct. (MAC); 1, Adna, July; 1, Lilliwaup, Aug. (USNM).

Remarks.—The vast majority of *M. al-*

bipes males are distinguished from other Nearctic *Metachela* by the distinctive long setae on the inner surface of the fore femora and by the long setae basoventrally on the fore femora (Fig. 2). The inner setae provide the best diagnosis, although they tend to be less prominent in some southern California specimens; however, these specimens still possess the long basal setae on the fore femora and thus are distinct from *M. collusor*. Male terminalia of *M. albipes* (Fig. 4) and *M. collusor* (Figs. 5–7) possess only subtle differences, which are not taxonomically useful because they are difficult to characterize.

Five males collected in California, three from Fresno Co., Bear Cr. (1–VIII-1979) and two from Siskiyou Co., Klamath National Forest., S. of Forks of Salmon R. (22–VII-1980) (CAS), that agreed with *M. albipes* in all other respects possessed terminalia that were reduced in size, contained relatively short setae in the apical fringe of the gonocoxites, and had much more slender epandrial lobes. I consider these males as structural variants of *albipes*, based on the existence of so few specimens, the occurrence of a similar pattern of variation in *M. collusor*, and lack of additional evidence that would suggest separate taxonomic status.

Metachela albipes is the most widely distributed Nearctic species of *Metachela*, occurring from eastern Canada and New Hampshire to western Canada, and south along the mountains of Montana, Washington, Oregon, and California (Fig. 8).

Metachela collusor (Melander)

Metachela collusor (Melander), 1902: 235 (*Hemerodromia*).

Diagnosis.—*Male*: Body length, including terminalia, ca. 4.0 mm. Inner surface of fore femora (Fig. 3) without long setae; fore femora relatively stout, less than 4 times longer than greatest width, with basoventral setae subequal to greatest width of fore femora in most specimens. Male terminalia as in Figs. 5–7; gonocoxites not expanded lat-

erally; apical fringe of gonocoxites with longest setae ca. as long as epandrial lobes in most specimens; apex of epandrial lobes smoothly rounded, without black setulae. *Female*: indistinguishable from females of other *Metachela* species.

Type material.—LECTOTYPE male, labelled “Dubois, Wyo/7200 ft/ ix 6. 95” here designated from Melander’s cotype series number 29180 (all in excellent condition). The lectotype and two male and three female paralectotypes are deposited in the United States Museum of Natural History (USNM).

Other specimens examined.—363 males. Alberta: 11, Banff, Aug.; 4, Wild Hay R. at Hwy. 40, June (CAS); 1, 20 mi. W. Calgary, June; 1, Jasper, July (CNC). British Columbia: 1, Mt. Fitzwilliam nr. Lucerne, Aug; 5, nr. Golden, Aug.; 10, Taylor Landing, Peace R., Aug.; 1, Kootenay Nat. Pk, Dolly Varden Cr., July (CAS). Yukon Territory: 9, 14 mi. E. Dawson, July–Aug.; 1, Swift R., Rancheria, Aug.; 2, Whitehorse, Aug. (AMNH); 1, Whitehorse, July (CNC); 2, Whitehorse, Aug. (USNM). Alaska: 20, Tok R., Glenn Hwy., Aug. (CAS); 2, Big Delta, July; 15, King Salmon, Naknek R., July; 1, Unalakleet, July (CNC). California: 55, Fresno Co., Huntington L., Rancheria Cr., Aug. (MAC, PERC); 2, Lone Pine, July (SNOW); 8, Alpine Co., Disaster Cr., July; 2, Alpine Co., Little Teton Cr., July; 1, Fresno Co., Bolsillo Cr. cmpgr., Aug.; 2, Fresno Co., Edison L., Aug.; 1, Mono Co., Leavitt Meadow, Aug.; 4, Tuolumne Co., Clark Fork R., July (CAS); 1, Sierra Nat. For., Vee Lake, Aug. (MAC). Colorado: 12, Boulder, Aug.; 1, Steamboat Springs, Aug.; 6, Chaffee Co., Garfield, Aug. (CAS); 1, Estes Park, July; 1, 3 mi. SW. Idaho Springs, July; 2, Raymond, St. Vrain Cr., Aug. (CNC); 1, Midland, Aug. (INHS); 1, Boulder Co., Boulder Cr., Sep.; 15, Estes Park, July; 1, Florissant, Aug.; 1, Rocky Mt. Nat. Pk., June; 2, N. St. Vrain Cr., Sep (USNM). Idaho: 1, Latah Co., Big Meadow Rec. area, June (JAMES); 5, Caribou Co., Kendall Cr., June–July; 1, Franklin Co., Aug. (USU). Montana: 1, Beaver

Cr., Aug.; 1, Ennis, Aug.; 1, Glacier Nat. Pk., Lake McDonald, June; 1, Glacier Nat. Pk., Logan Falls, July; 3, Glacier Nat. Pk., Second Medicine L., Aug. (USNM). Nevada: 1, Washoe Co., Verdi, June (CAS). Oregon: 4, Clackamas Co., Mt. Hood Nat. For., Tollgate empgr., June; 28, Klamath Co., 5 mi N. Chiloquin, June; 2, Wasco Co., Warm Springs Indiana Res., Beaver Cr., June (CAS); 1, Clack. Co., nr. Rhodendron, June (JAMES); 2, Corvallis, June; 3, Hood River, June (USNM). South Dakota: 19, Lawrence Co., Spearfish Cr., June (USNM). Utah: 9, Cache Nat. For., Wasatch Mts., July (USNM); 1, Cache Co., Logan Canyon, June; 1, Jaub Co., Mt. Nebo, July-Aug. (USU). Washington: 11, Mt. Ranier Nat. Pk., Fish Cr., Aug. (CAS); 1, Glenwood, Klickitat R., June (CNC); 3, Glenwood, Klickitat R., June (CU); 15, Asotin Co., Asotin Cr., June; 2, Mt. Ranier Nat. Pk., Tahoma R., Aug.; 1, Yakima Co., Nile, June (JAMES); 24, Glenwood, Klickitat R., June-July; 3, Husan, July; 1, Spokane, Aug. (USNM). Wyoming: 1, Yellowstone Nat. Pk., Aug. (UCR); 1, Canyon Camp, Aug.; 2, Indiana Cr., July; 4, Madison R., Riverside, Aug.; 2, W. Craigs Pass, Aug. (USNM).

Remarks.—Absence of long setae on the inner surface and existence of shorter setae basoventrally on the fore femora of males distinguish *M. collusor* from *M. albipes*. The latter trait is somewhat variable, with some *M. collusor* males possessing basoventral setae that are longer than the greatest width of the fore femora. However, the fore femora of such specimens are relatively thick (their length less than four times their greatest width) and there are no long setae on the inner surface.

Metachela collusor is a widespread western species, distributed from western Alaska south into the Sierra Nevada Mountains of central California and the central Rocky Mountains (Fig. 8). Variation in pigmentation of the fore coxae and in terminalia structure exists throughout the range of this species, as described below.

Variation in the pigmentation of the fore coxae of males in several series of *M. collusor* from Alaska, British Columbia, central Colorado, and Yukon Territory resulted in coloration ranging from entirely yellow to entirely dark brown. Specimens with various forms of intermediate pigmentation of the fore coxae were collected concurrently and lacked consistent differences in other characters, including details of male terminalia.

The predominant terminalia structure of *M. collusor* males is depicted in Fig. 5, but variation in size and shape of the component parts existed throughout the range. The two extreme forms of this variation (Figs. 6, 7) are firstly, a hypandrium with somewhat digitate apical processes (Fig. 6) and secondly, terminalia of substantially smaller overall size with an accompanying reduction in the aedeagal apodeme and length of setae in the gonocoxite fringe (Fig. 7).

The form of terminalia with two digitate processes at the apex of the hypandrium (Fig. 6) existed on 12 males from Naknek, Alaska (CNC), four males from Caribou County, Utah (USU), and five males from Lawrence County, South Dakota (USNM). The males from Alaska and South Dakota were part of series of concurrently collected males that included individuals with the predominant form of terminalia (Fig. 5) and a few specimens that could be placed with either the digitate form or the predominant form, depending on how they were viewed. Macerated terminalia of one of these males, which was difficult to place before dissection, revealed that only one side of the apex of the hypandrium appeared "digitate"; the other side of the hypandrium resembled the apex of the predominant form. The appearance of these two forms of *M. collusor* terminalia stems, at least in part, from the variable manner in which the hypandrium collapses on killed specimens as they dry. Another contributing factor to an appearance of distinctiveness in structure is the size of the hypandrium, with the digitate

form of hypandrium tending to be smaller and more slender than the predominant form.

The type of terminalia of an overall much smaller size (Fig. 7) existed on 53 males collected above Huntington Lake, Fresno County, California (MAC), one male from Alpine county and another from Tuolumne County, California (CAS), two males from Lone Pine, California (SNOW), six males from Chaffee County, Colorado (CAS), two males from near Raymond, Colorado (CNC), three males from Cache County, Utah (USU), and one male from near Lucerne, British Columbia (CAS). The 53 males from above Huntington Lake (collected in a Malaise trap set across a tributary to Rancheria Creek) were part of a series, collected concurrently, that included three males with the predominant form of terminalia and two males with terminalia that were intermediate in terms of overall size, size of the aedeagal apodeme, and length of setae forming the gonocoxite fringe. I consider males with this much smaller form of terminalia (due largely to reduction in the hypandrium) to be structural variants of *M. collusor*, based on the presence of intermediates and the fact that other structural variation in terminalia is common among *M. collusor* males, as mentioned above.

***Metachela convexa* MacDonald,
New Species**

Description.—*Male*: Body length, including terminalia, ca. 3.8 mm. In general, matching the generic description with regard to coloration, vestiture, and venation. Fore femora without fringe of long setae on inner surface; relatively stout, less than 4 times longer than greatest width, with basoventral setae about as long as greatest width. Terminalia (Fig. 1) with large, strongly convex gonocoxites that overlap hypandrium below and epandrial lobes above; apical fringe on gonocoxites with longest setae shorter than epandrial lobes;

median margin of epandrial lobes expanded into rounded, apicodorsal process lined with black setulae. *Female*: unknown; none associated with concurrently collected males.

Type material.—HOLOTYPE male, top label "U. S. A.: California:/Shasta County, Honn/Creek Campground, /Hat Creek, 29 km. SE./Burney, 30-VII-1974" and bottom label "Paul H. Arnaud, Jr./Calif. Acad. Sci. Coll."; macerated terminalia in glycerin microvial attached to pin. Holotype deposited in the California Academy of Science Collection (CAS). PARATYPES.—2 males. California: Shasta Co., Lassen Volcanic Nat. Park, 2.4 km. W. Kings Cr., July (CAS). Oregon: Klamath Co., 5 mi N. Chiloquin, on Williamson R., June (CAS).

Remarks—The specific epithet refers to the large, strongly convex gonocoxites that are diagnostic for this species. Nothing is known about the biology of *M. convexa* which, based on only 3 specimens, appears to be restricted to northern California and southern Oregon (Fig. 8).

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